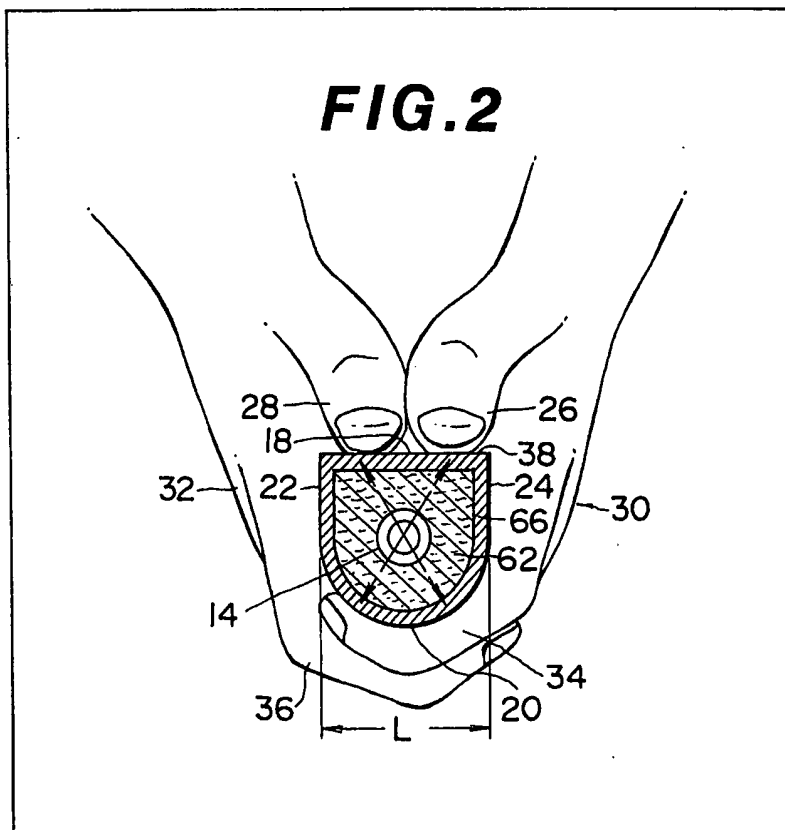


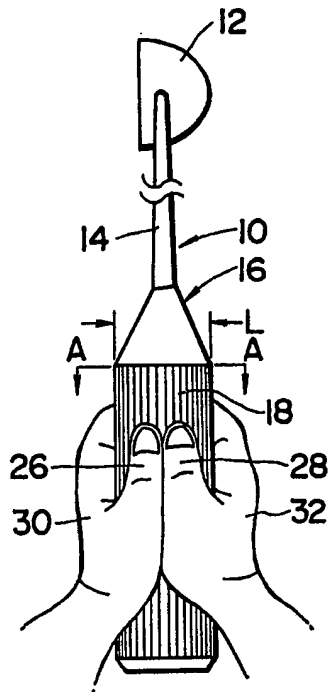
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 US 4067573  
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(54) Golf club

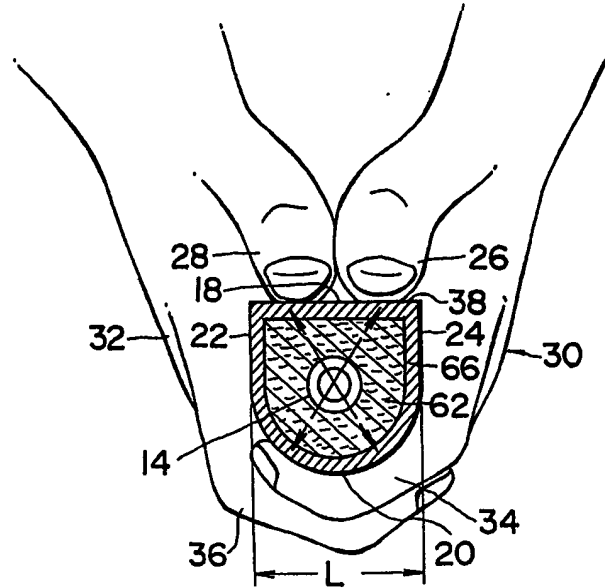
(57) A golf club comprises a grip having a plurality of faces (18, 20, 22, 24) one of the faces (18) having a width sufficient to juxtapose the thumbs (26, 28) of a golfer, the total width dimension of the remaining faces (20, 22, 24) being such that the tip of any finger (34, 36) other than the thumb of either hand (30, 32) of the golfer engages the grip at a position diagonally opposite the thumb (26, 28) of the same hand (30, 32) when the thumbs (26, 28) are juxtaposed along said one face (18) and the grip is grasped with both hands with the fingers (34, 36) of one hand (30, 32) overlapping the fingers (34, 36) of the other hand (30, 32).



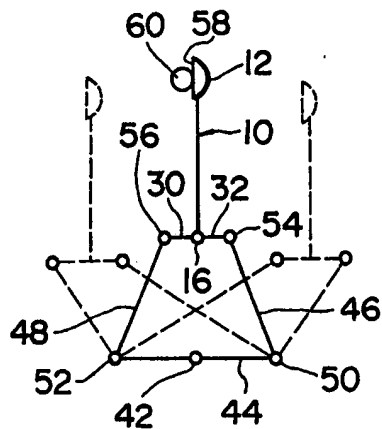
**FIG.1**



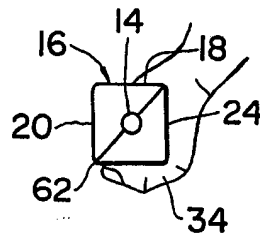
**FIG.2**



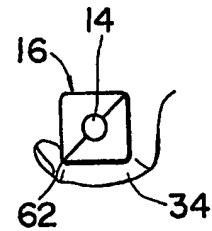
**FIG.3**



**FIG.4**



**FIG.5**

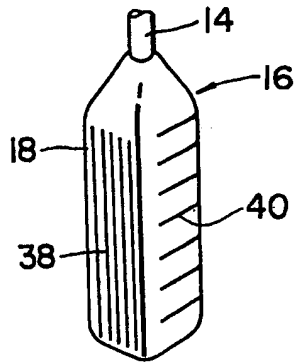
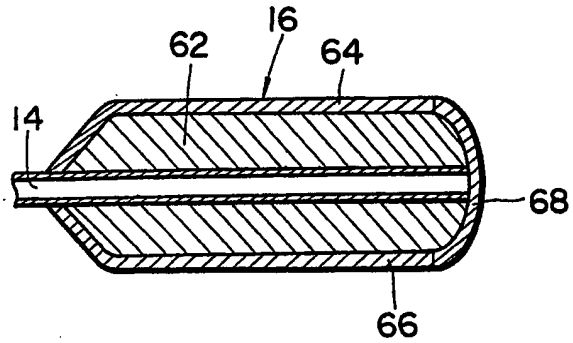
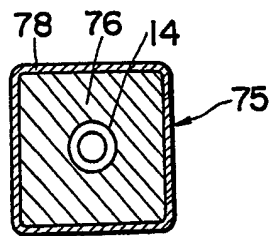
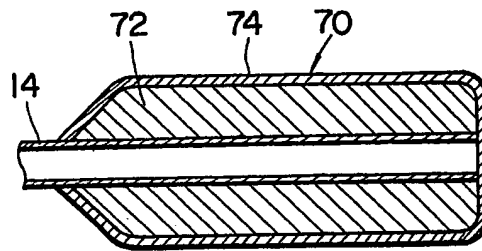
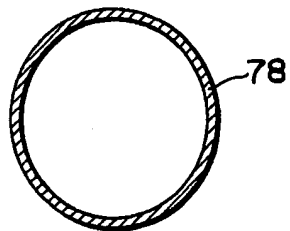
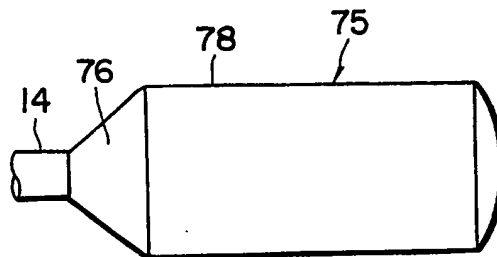


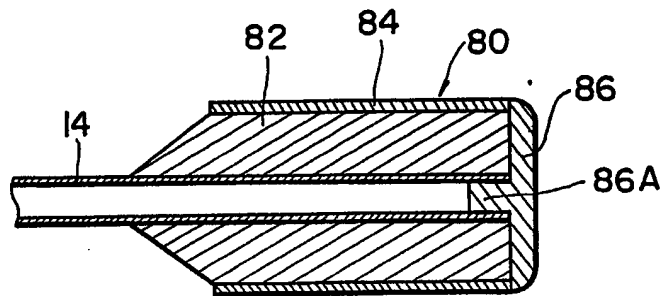
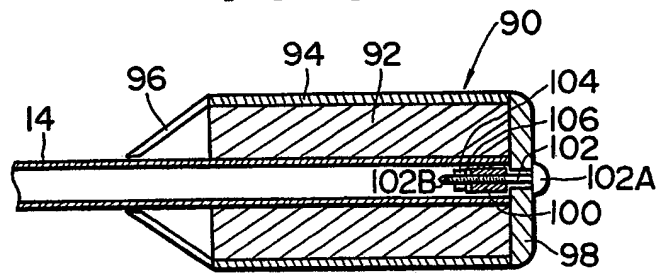
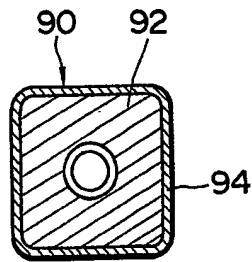
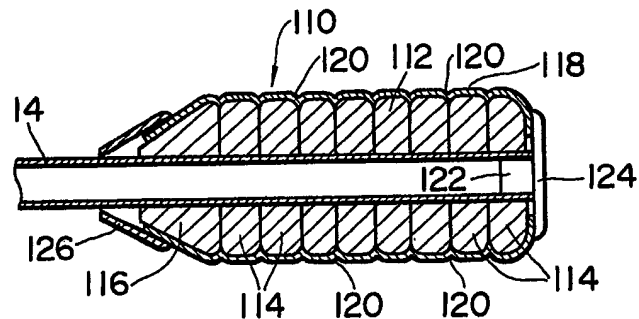
**FIG.6**



**FIG.7**

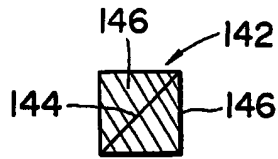
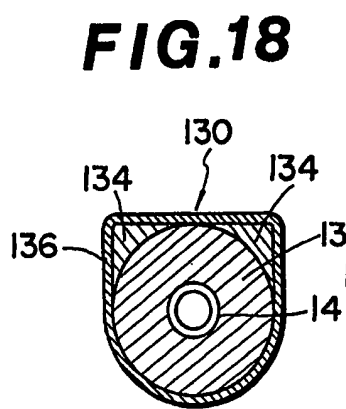


**FIG.8****FIG.9****FIG.12****FIG.10****FIG.13****FIG.11**

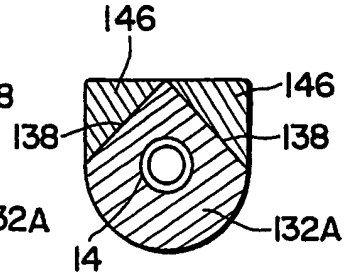
**FIG.14****FIG.15****FIG.16****FIG.17**

**FIG.19**

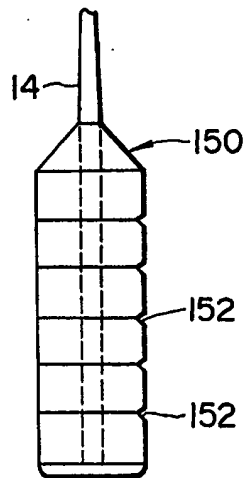
**FIG.18**



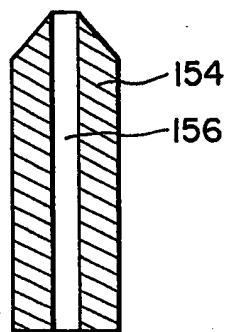
**FIG.20**



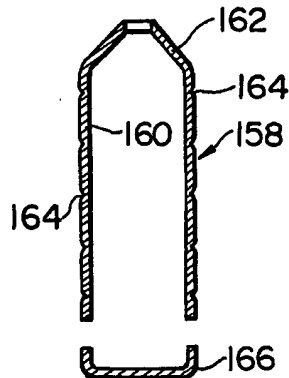
**FIG.21**



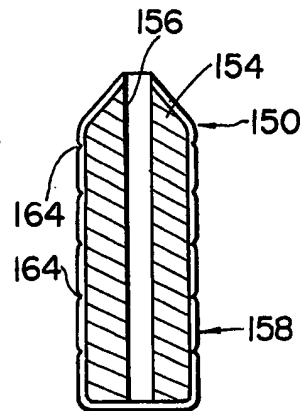
**FIG.22**



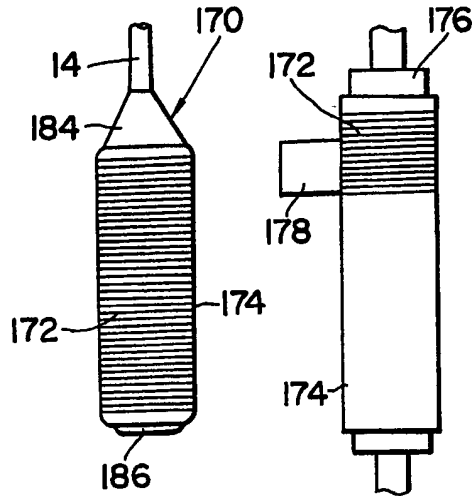
**FIG.23**



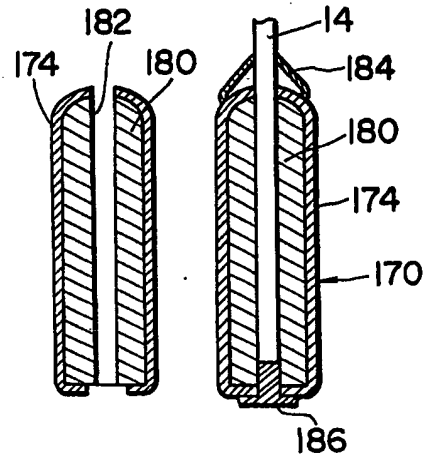
**FIG.24**



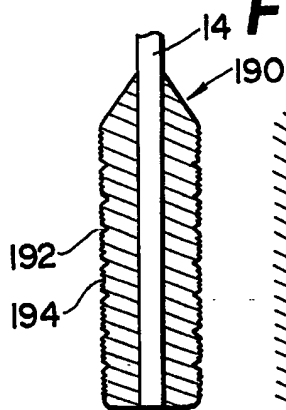
**FIG.25 FIG.26**



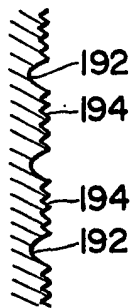
**FIG.27 FIG.28**



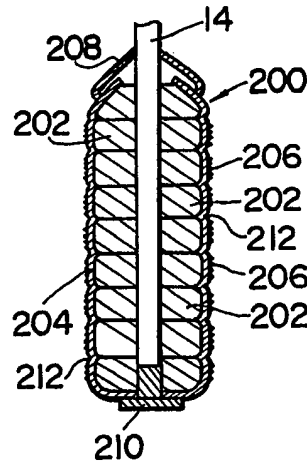
**FIG.29**



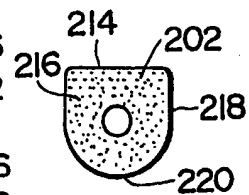
**FIG.30**



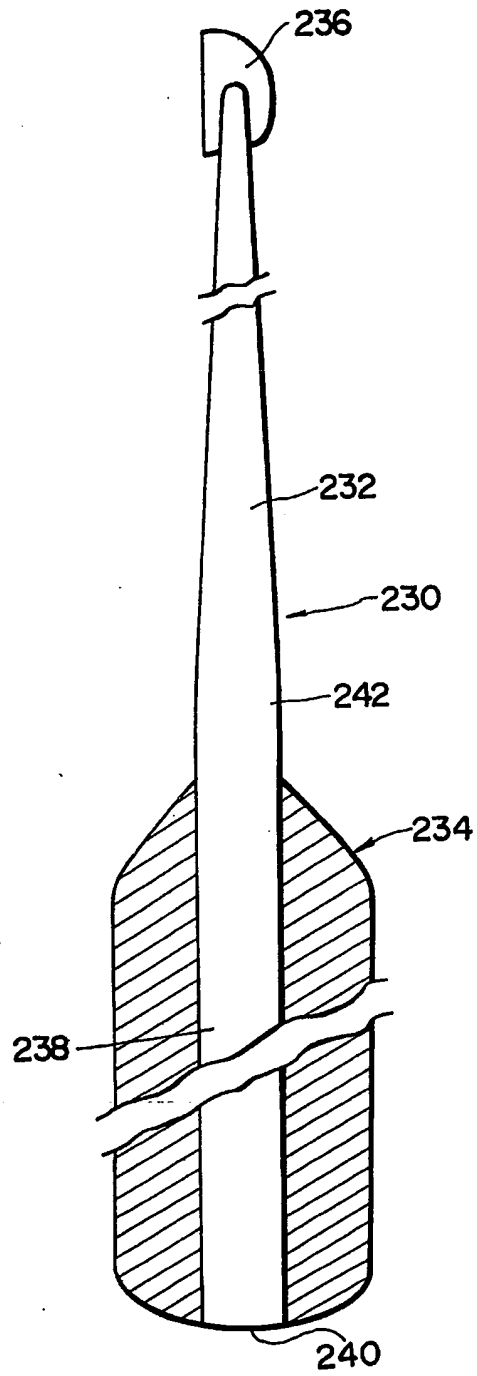
**FIG.31**



**FIG.32**



**FIG.33**



## SPECIFICATION

## Golf club

- 5 The invention relates to a golf club having a grip which is grasped by a golfer in a novel and advantageous manner.

In a conventional golf club the grip is of a tapered cylindrical shape and is grasped by locking the fingers of the hands of the golfer. If the grip is improperly grasped by the golfer, the movement and/or orientation of the club head may adversely be affected by the improper grasp when a golf ball is struck. When a golf club having a grip of the tapered cylindrical shape is swung by a golfer, an undesirable force may be exerted on the body of the golfer.

- 10 It is one object of the invention to provide a golf club having a grip which can be grasped by any golfer in a simple manner without interlocking the fingers of the hands and in which no undesirable force will be exerted on his body when a golf ball is struck.

According to the invention there is provided in one aspect a golf club comprising a grip having a plurality of faces, one of the faces having a width sufficient to juxtapose the thumbs of a golfer, the total width dimension of the remaining faces being such that the tip of any finger (other than the thumb) of either hand of the golfer engages the grip at a position diagonally opposite the thumb of the same hand when the thumbs are juxtaposed along the one face and the grip is grasped with both hands with the fingers of one hand overlapping the fingers of the other hand.

- 35 The face on which the thumbs are placed may be flat or outwardly curved and the face opposite the face on which the thumbs are placed may also be outwardly curved so that the golfer can comfortably grasp the grip with both hands.

- 40 In order to prevent the golfer's grasp from slipping when the club is swung the face on which the thumbs are placed may have a plurality of longitudinal grooves and adjacent faces may have transverse grooves.

- 45 The longitudinal grooves preferably have a width or depth in the range of 0.5 to 0.8 mm. If the width or depth is below this range the thumbs tend to slip and if the width or depth is above this range the golfer tends to feel pain in his thumbs.

- 50 Preferably the width of the grip is in the range of 25 to 52 mm.

The grip may consist of an elastic core placed about the shaft of the golf club and a cover enveloping the core. The grip may be tapered towards the head of the club. The core may be made from any suitable elastic material such as bonded natural cork or cork powder, polyurethane foam, ethylene vinyl acetate or polyethylene.

- In order to produce a grip having a flat face it is convenient to make the core in several parts consisting of a substantially cylindrical body part and other parts which are adhered to the main part to form the flat face. Preferably the body part has two flat surfaces to which are adhered two triangular shaped parts.

The cover may be made from any impact and scratch resistant material which is also slip proof and so will prevent the golfer's thumbs from slipping on the cover. Examples of suitable materials are rubber and leather. When the cover is made from rubber the thickness of the cover is preferably of the order of 3 mm. The cover may consist of a substantially cylindrical body portion and an end cap portion.

- 70 The core may be bonded to the periphery of the shaft by a suitable adhesive and the cover may be similarly bonded to the core.

In one embodiment the core is of square cross-section and a cover of circular cross-section is stretched over the core so as to fit the configuration of the core.

- 80 In another embodiment the grip has a core having a flat end and a tapered end, and a cover which envelopes only the faces of the grip. The flat end of the core is covered by a cap, for example of aluminium, which may engage the shaft by reception of a stub in a bore of the shaft, or by a nut and bolt engagement.

In another embodiment the core of the grip consists of a plurality of chamfered plate-like members and a frusto-conical end member or the end of the grip nearer to the head of the club. The plate-like members are in contact with one another and the chambers of adjacent members define a series of grooves around the periphery of the grip. Each of the members has a central aperture through which the shaft of the club is passed and the two end members are covered with a cap. A cover, for example of rubber, is fitted over the members so as to form transverse grooves corresponding to the grooves between the chamfers of adjacent members.

- 100 In another embodiment a cover having transverse grooves in its outer surface is fitted over and adhered to a core of cork, polyurethane foam or similar material.

- 105 In another embodiment fine transverse grooves are cut in the outer surface of a cover fitted on a rotating mandrel and the cover is then fitted, for example by heat shrinkage, on to a core.

When a golf club is grasped by the golfer as described and used to strike a golf ball in the usual manner the golf ball is propelled straighter and further than with a conventional golf club.

- The invention is illustrated by way of example with reference to the accompanying diagrammatic drawings in which:-

115 *Figure 1* is a plan view of a golf club having a grip according to the invention, showing the grip properly grasped by a golfer with his hands;

- 120 *Figure 2* is a view showing the golfer's hands as viewed from the head of the golf club in *Figure 1*, the grip being shown in cross-section taken along the line A-A in *Figure 1*;

*Figure 3* illustrates the movement of a golf club according to the invention when it is swung by the golfer;

- 125 *Figures 4 to 7* illustrate how grips of the prior art and the present invention are grasped;

*Figure 8* is a perspective view of a grip which is another embodiment of the invention;

- 130 *Figures 9 and 10* are longitudinal sections of other



grips according to the invention;

*Figure 11* is a side view of still another grip according to the invention;

*Figure 12* is a cross-section of the grip shown in 5 *Figure 11*;

*Figure 13* is a cross-section of a covering shown in *Figures 11* and *12* prior to mounting on the grip;

*Figure 14* is a longitudinal section of a grip which is a further embodiment of the invention;

10 *Figure 15* is a longitudinal section of a grip which is still a further embodiment of the invention;

*Figure 16* is a cross-section of the grip shown in *Figure 15*;

15 *Figure 17* is a longitudinal section of a grip which is further embodiment of the invention;

*Figures 18* to *20* illustrate a process of manufacturing a grip in accordance with the invention;

*Figure 21* is a side view of a grip which is further embodiment of the invention;

20 *Figures 22* to *24* illustrate a process of manufacturing the grip shown in *Figure 21*;

*Figure 25* is a side view of a grip which is a further embodiment of the invention;

25 *Figures 26* to *28* illustrate a process of manufacturing the grip shown in *Figure 25*;

*Figure 29* is a longitudinal section of a grip which is a further embodiment of the invention;

*Figure 30* is a fragmentary enlarged view showing part of the grip shown in *Figure 29*;

30 *Figure 31* is a longitudinal section of a grip which is a further embodiment of the invention;

*Figure 32* is a plan view showing a plate-like element used in the grip of *Figure 31*; and

35 *Figure 33* is a side view of a golf club according to the invention, the grip being shown in section.

Referring to *Figures 1* and *2*, a golf club has a conventional head *12* attached to one end of a shaft *4* and mounted on the other end of the shaft *14* a grip *16* which is constructed according to the invention.

40 The grip *16* has four faces *18*, *20*, *22* and *24*. The face *18*, which is positioned upward when the grip *16* is properly grasped by a golfer, is flat and has a width *L* sufficient to juxtapose the thumbs *26*, *28* of the golfer's hands *30*, *32*. The total width dimension of 45 the remaining faces *20*, *22* and *24* is such that the tip of finger other than the thumb *26* or *28* (forefinger *34* or *36* in the illustrated embodiment) of either hand *30* or *32* of the golfer engages the grip *16* at a position diagonally opposite the thumb *26* or *28* of 50 the same hand *30* or *32* when the thumbs are juxtaposed along the face *18* and the grip is grasped with both hands with the fingers of one hand overlapping the fingers of the other hand.

In the illustrated embodiment, the face *20* is 55 outwardly curved such that the golfer will grasp the grip *16* with his hands.

The face *18* includes a plurality of longitudinal grooves formed therein to prevent the thumbs *26* and *28* from slipping when the golf club is swung by 60 the golfer. A plurality of transverse grooves *40* may be formed on the opposite faces *22* and *24* of the grip *16* for the same purpose, as shown in *Figure 8*.

Since the grip *16* according to the invention is grasped in a manner completely different from the 65 conventional manner, the swinging movement of

the golf club is completely different from that of a conventional golf club as shown in *Figure 3*. A golfer *42* holds the golf club *10* to form a pantograph defined by the body *44*, arms *46*, *48* and hands *30*, *32*, and horizontally moves it from a position shown by a broken line at the right in *Figure 3* to another position shown by a broken line at the left therein through a middle position shown by a solid line with 70 rotational movements around the joints *50*, *52*, *54* and *56* of the shoulders and wrists of the golfer *42*. Therefore, the impact face *58* of the head *12* of the golf club *10* will strike a golf ball *60* such that the impact face *58* is positioned perpendicular to the direction in which the golf ball *60* is to be propelled. Thus, the golf ball *60* can be propelled straight in the 80 desired direction. Further, the grip *16* according to the invention is grasped by the golfer *42* with his hands *30* and *32* in a simpler manner than the conventional manner.

85 If the total width dimension of the faces *20*, *24* and *26* is too large, the tip of the forefinger *34* does not reach the lower corner *62* of the grip *16* as shown in *Figure 4*. Therefore, the movement around the shaft *14* becomes smaller making the grasp unstable and 90 the golf ball will not be propelled straight. If the tip of the forefinger *34* positively engages the corner *62* of the grip *16* as shown in *Figure 5*, the grasp is made more stable and the golf ball is propelled straight.

In the grip according to the invention, the overlap 95 in the inner surfaces of the fingers and palms in the golfer's hands is smaller than that in the conventional grips as seen from *Figures 6* and *7*. Therefore, the moment about the shaft *14* in the grip *16* can more be resisted by the golfer's hands so that the club 100 head will not be disturbed in direction when the golf club is swung by the golfer. Since the grip is more strongly grasped by the golfer, the propelled ball may travel a longer distance.

Referring to *Figures 2* and *9*, the grip *16* consists of 105 an elastic core *62* disposed about the shaft *14* and a cover *64* enveloping the elastic core *62*. The core *62* is tapered at one end towards the club head. The cover *64* includes a body portion *66* of a substantially cylindrical shape and an end cap portion *68*. The 110 core *62* is bonded to the periphery of the shaft *14* by an adhesive while the cover *64* is similarly bonded to the outer periphery of the core *62* by an adhesive.

Figure *10* shows a grip *70* composed of a foamed core *72* which is made of polyurethane foam, 115 ethylene vinyl acetate, polyethylene or the like, and a cover *74* enveloping the core *72* and made of rubber or the like.

Referring to *Figures 11* to *13*, a grip *75* consists of a 120 core *76* of cork having a square cross-section and a cover *78* of rubber enveloping the core *76*. The cover *78* is first extruded into a circular cross-section as shown in *Figure 13* and then disposed over the core *76* to form a square cross-section corresponding to the square cross-section of the core *76*.

125 *Figure 14* shows an embodiment of the invention in which a grip *80* includes a core *82* of cork having a tapered end and a flat end, and a cover *84* enveloping the entire faces of the core *82* but not the tapered and flat ends thereof. The flat end of the core *82* is 130 covered by a cap *86* of aluminium or the like which

has a central stub 86A formed therein. The central stub 86A is fitted into the bore of the shaft 14 to mount the cap 86 on the grip 80.

Figures 15 and 16 show a grip 90 including an elastic core 92 of square cross-section which is cut to length from a continuous extruded tube and fitted over the end of the club shaft 14. The core 92 is covered by a cover 94 except the opposite flat ends thereof. The end of the core 92 on the side of the club head (not shown) is covered by a frusto-conical cover 96 made of celluloid or plastics while the other end of the core 92 is covered by an end cap 98 made of material such as aluminium or plastics material such as ABS resin. The end cap 98 is fixed to the club shaft 14 and core 92 by fastening means which includes a ring 100 of rubber inserted into the bore of the club shaft 14, a bolt 102 passed through the aperture in the end cap 98 and the bore of the ring 100 with the head 102A thereof engaged by the outer face of the end cap 98, and a nut 104 screwed into the threaded end 102B of the bolt 102 through a washer 106. When the bolt 102 is tightened, the outer diameter of the rubber ring 100 is increased to engage the outer periphery thereof with the inner wall of the club shaft 14 for securing the end cap 98 relative to the grip 90.

A grip 110 shown in Figure 17 includes an elastic core 112 consisting of a plurality of chamfered plate-like cork members 114 and a frusto-conical end member 116. The members 114, 116 are located in contact with one another and the chamfers of adjacent members define grooves around the periphery of the grip 110. The stacked core members are covered by a rubber covering 118 of about one millimeter thick except for portions of the extreme members faced outwardly. The rubber covering 118 is conformed to the outline of the stacked core members 114 and 116 to form a plurality of transverse grooves 120 perpendicular to the longitudinal axis of the grip 110 at positions corresponding to the respective grooves between the chamfers of the adjacent core members.

Each of the core members 114 and 116 has a central bore and the end of the club shaft 14 is passed through the bores of the stacked core members. The extremity of the bore in the club shaft 14 receives a stub 122 of an end cap 124 which covers the exposed portion of the extreme core member 114. The exposed portion of the frusto-conical member 116 is covered by a frusto-conical cap 126. Both the caps 124 and 126 may be made of any suitable plastics material.

Figure 18 shows a grip 130 having a cylindrical core 132, two corner core elements 134 of substantially triangular shape which are adhered to the outer periphery of the core 132, and a cover 136 of rubber enveloping the cylindrical and corner cores 132 and 134.

For convenience of manufacture, it is normally advantageous that the core is formed in a cylindrical shape with its bore receiving the club shaft 14 and two corner cores are then adhered to the outer periphery of the cylindrical core to provide a flat side face with which the thumbs of the golfer engage. The grip 130 shown in Figure 18 is disadvantageous

in that it includes two corner cores each having a curved surface to be adhered to the outer periphery of the cylindrical core. In order to overcome the problem, the cylindrical core 132A may be cut out along broken lines 138 to remove pieces 140 therefrom as shown in Figure 19, and a cork piece 142 of square cross-section may be cut in two along a diagonal line 144 to form triangular elements 146 which are in turn adhered to the flat faces 138 of the core member 132A to form the same cross-section as that of Figure 18, as shown in Figure 20.

Figure 21 shows a grip 150 having a plurality of transverse grooves 152 which are produced in accordance with a process shown in Figures 22, 23 and 24. First of all, as shown in Figure 22, an elastic core 154 is made of any suitable material such as cork, polyurethane foam or the like with a bore 156 receiving the end of the club shaft. As shown in Figure 23, a cover 158 is then formed from any suitable material, such as rubber, and consists of a tubular body portion 160 having a tapered end 162 and a plurality of transverse spaced grooves 164 formed in its outer surface and a cap portion 166 of the same material. Such a cover 158 is then adhered to the core 154 to envelop it. The resultant grip 150 has a plurality of transverse spaced grooves 164 on the outer surfaces thereof, as shown in Figure 24.

Figure 25 shows a grip 170 having a plurality of fine transverse grooves 172 on the outer surfaces thereof. In this embodiment, the grip 170 includes a cover 174 which is formed with grooves 172 by the following process: the cover 174 is first mounted on a rotary mandrel 176 as shown in Figure 26. When the mandrel 176 is being rotated, the outer surface of the cover 174 is engaged by a working member 178 to form grooves 172 thereon. Therefore, the working cover 174 is mounted on a core 180 to envelop it, for example, under heat shrinkage as shown in Figure 27. As previously described, the club shaft 14 is then inserted into the bore 182 of the core 180. The opposite ends of the grip 170 are closed respectively by a frusto-conical end cap 184 and an end cap 186, as shown in Figure 28.

Figures 29 and 30 show a grip 190 having a plurality of transverse grooves 192 formed in the outer surfaces thereof and a plurality of transverse grooves 194 which are of a depth smaller than that of the grooves 192 and disposed between the grooves 194.

Figure 31 shows a grip 200 having a plurality of plate-like stacked core members 202 of cork, a covering 204 enveloping the stacked core members 202 and having a plurality of fine transverse grooves 206 formed on the outer surface thereof, and end caps 208 and 210 as in the previous embodiments. The opposite edges of each of the core members 202 are chamfered except for the extreme core members, so that a groove 212 will be formed between the chamfered edges of adjacent core members 202 when the cover 204 is mounted on the stacked core members 202. These grooves 212 have a depth larger than that of one of the fine transverse grooves 206.

In the embodiment shown in Figure 31, each of the core members 202 has a configuration as shown in

Figure 32. This configuration is similar to that in the embodiment shown in Figure 2 and includes three flat faces 214, 216 and 218 and an outwardly curved face 220. Grooves 206 and 212 may be formed in the outer surface of the grip 200 corresponding to the faces 216, 218 and 220 while a plurality of longitudinal grooves as in Figure 8 may be formed in the outer surface of the grip 200 corresponding to the face 214.

Figure 33 shows a golf club 230 including a shaft 232, a grip 234 constructed according to the invention and mounted on the shaft 232 at one end of the shaft and a head 236 mounted on the other end of shaft 232. The shaft 232 has a portion 238 inserted into the bore of the grip 234 and an outer diameter 240 which is constant from its one end 240 to an intermediate location 242 situated slightly outside the grip 234. The shaft 232 is tapered from the location 242 toward the head 236 to have the minimum outer diameter adjacent to the head. By forming the shaft 232 in such a manner, the grip 234 can be easily and simply manufactured and assembled on the shaft 232.

#### CLAIMS

1. A golf club comprising a shaft having a head at one end and a grip at the other, the grip having a plurality of faces, one of the faces having a width sufficient to juxtapose both thumbs of the golfer, the total width dimension of the remaining faces being such that the tip of any finger other than the thumb of either hand of a golfer engages the grip at a position diagonally opposite the thumb of the same hand when the thumbs are juxtaposed along the one face and the grip is grasped with both hands with the fingers of one hand overlapping the fingers of the other hand.
2. A golf club according to Claim 1, wherein the one face of the grip is flat or outwardly curved, and the face opposite the one face is outwardly curved.
3. A golf club according to Claim 1 or 2, wherein the grip is of substantially square cross-section.
4. A golf club according to any preceding Claim, wherein the one face of the grip has a plurality of longitudinal grooves.
5. A golf club according to Claim 4, wherein the grooves range from 0.5 to 0.8 mm in depth or width.
6. A golf club according to any preceding Claim, wherein the faces adjacent the one face each have a plurality of transverse grooves.
7. A golf club according to any preceding Claim, wherein the grip comprises an elastic core and a cover enveloping the elastic core, the core being located about a shaft.
8. A golf club according to Claim 7, wherein the elastic core comprises a plurality of chamfered plate-like members disposed in side-by-side relation, the chamfers of adjacent members defining a transverse groove around the periphery of the grip.
9. A golf club according to Claim 7 or 8, wherein the longitudinal and/or transverse extending grooves are formed in the cover of the core.
10. A golf club according to Claim 9, wherein the grooves are of a width smaller than that of the groove defined by the chamfers of adjacent mem-

bers of the core.

11. A golf club according to any preceding Claim, wherein the grip is attached to one end of a shaft and a head is attached to the other end of the shaft, the shaft having a first portion of constant diameter enveloped by the grip and a second portion tapering inwardly from the end of the first portion towards the head.

12. A golf club according to any preceding Claim wherein the grip has a width of 25 to 52 mm.

13. A golf club substantially as herein described with reference to the accompanying drawings.

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